55794
C125
b
(v.3, no.18)

UNIVERSITY OF CALIFORNIA PUBLICATIONS
Bulletin of the Department of Geology
Vol. 3, No. 18, pp. 397-402, Pl. 47. ANDREW C. LAWSON, Editor

A NEW CESTRACIONT SPINE FROM THE LOWER TRIASSIC OF IDAHO

BY

HERBERT M. EVANS

BERKELEY
THE UNIVERSITY PRESS
MAY, 1904

PRICE 10 CENTS

The Bulletin of the Department of Geology of the University of California is issued at irregular intervals in the form of separate papers or memoirs, each embodying the results of research by some competent investigator in geological science. It is designed to have these made up into volumes of from 400 to 500 pages. The price per volume is placed at $3.50, including postage. The papers composing the volumes will be sent to subscribers in separate covers as soon as issued. The separate numbers may be purchased at the following prices from the University Librarian, J. C. Rowell, to whom remittances should be addressed:—

VOLUME 1.

No. 1.	The Geology of Carmelo Bay, by Andrew C. Lawson, with chemical analyses and coöperation in the field, by Juan de la C. Posada	Price, 25c
No. 2.	The Soda-Rhyolite North of Berkeley, by Charles Palache	Price, 10c
No. 3.	The Eruptive Rocks of Point Bonita, by F. Leslie Ransome	Price, 40c
No. 4.	The Post-Pliocene Diastrophism of the Coast of Southern California, by Andrew C. Lawson	Price, 40c
No. 5.	The Lherzolite-Serpentine and Associated Rocks of the Potreo, San Francisco, by Charles Palache	In one cover. Price, 30c
No. 6.	On a Rock, from the Vicinity of Berkeley, containing a New Soda Amphibole, by Charles Palache	
No. 7.	The Geology of Angel Island, by F. Leslie Ransome, with a Note on the Radiolarian Chert from Angel Island and from Buri-buri Ridge, San Mateo County, California, by George Jennings Hinde	Price, 45c
No. 8.	The Geomorphogeny of the Coast of Northern California, by Andrew C. Lawson	Price, 30c
No. 9.	On Analcite Diabase from San Luis Obispo County, California, by Harold W. Fairbanks	Price, 25c
No. 10.	On Lawsonite, a New Rock-forming Mineral from the Tiburon Peninsula, Marin County, California, by F. Leslie Ransome	Price, 10c
No. 11.	Critical Periods in the History of the Earth, by Joseph Le Conte	Price, 20c
No. 12.	On Malignite, a Family of Basic, Plutonic, Orthoclase Rocks, Rich in Alkalies and Lime, Intrusive in the Coutchiching Schists of Poohbah Lake, by Andrew C. Lawson	Price, 20c
No. 13.	Sigmogomphius Le Contei, a New Castoroid Rodent, from the Pliocene, near Berkeley, by John C. Merriam	Price, 10c
No. 14.	The Great Valley of California, a Criticism of the Theory of Isostasy, by F. Leslie Ransome	Price, 45c

VOLUME 2.

No. 1.	The Geology of Point Sal, By Harold W. Fairbanks	Price, 65c
No. 2.	On Some Pliocene Ostracoda from near Berkeley, by Frederick Chapman	Price, 10c
No. 3.	Note on Two Tertiary Faunas from the Rocks of the Southern Coast of Vancouver Island, by J. C. Merriam	Price, 10c
No. 4.	The Distribution of the Neocene Sea-urchins of Middle California, and Its Bearing on the Classification of the Neocene Formations, by John C. Merriam	Price, 10c
No. 5.	The Geology of Point Reyes Peninsula, by F. M. Anderson	Price, 25c
No. 6.	Some Aspects of Erosion in Relation to the Theory of the Peneplain, by W. S. Tangier Smith	Price, 20c
No. 7.	A Topographic Study of the Islands of Southern California, by W. S. Tangier Smith	Price, 40c
No. 8.	The Geology of the Central Portion of the Isthmus of Panama, by Oscar H. Hershey	Price, 30c
No. 9.	A Contribution to the Geology of the John Day Basin, by John C. Merriam	Price, 35c
No. 10.	Mineralogical Notes, by Arthur S. Eakle	Price, 10c
No. 11.	Contributions to the Mineralogy of California, by Walter C. Blasdale	Price, 15c
No. 12.	The Berkeley Hills. A Detail of Coast Range Geology, by Andrew C. Lawson and Charles Palache	Price, 80c

UNIVERSITY OF CALIFORNIA PUBLICATIONS
Bulletin of the Department of Geology
Vol. 3, No. 18, pp. 397-402, Pl. 47. ANDREW C. LAWSON, Editor

A NEW CESTRACIONT SPINE FROM THE LOWER TRIASSIC OF IDAHO

BY

Herbert M. Evans.

CONTENTS.

PAGE
Occurrence and State of Preservation 397
Description 398
Affinities 399

OCCURRENCE AND STATE OF PRESERVATION.

The fossil fish spine described in the following paper was obtained on a palaeontological expedition to southern Idaho, during the summer of 1903, for the purpose of examining the lower Triassic exposures at Aspen Ridge and Paris Canyon. The spine was discovered at the latter locality by Professor John C. Merriam, to whom the author is indebted for advice in the study of the specimen. It was found in an exposure of the lower Triassic in Paris Canyon and about one mile west of the town of Paris.

The associated invertebrate fauna was examined by Professor James Perrin Smith of Leland Stanford Jr. University, who was a member of the party. Professor Smith has made a special investigation of both the Aspen Ridge and the Paris beds, and the geologic position of the Paris horizon is best given in the following note which he has kindly furnished:

"The beds in Paris Canyon are lower Triassic but below the typical Meekoceras beds of the Aspen range. They contain species of the genera *Meekoceras*, *Prionolobus*, *Ophiceras*, *Pseu-*

WELLESLEY COLLEGE
JUL 9 1942
LIBRARY

dosageceras, and *Celtites*. The *Pseudosageceras* seems to be the only species common to these beds and those of the Aspen ridge."

On splitting the slab containing the specimen, the spine broke from the surrounding matrix leaving on the rock, the thin surface layer of the spine, together with the ganoine-coated tubercles which ornamented it. Consequently the ornamentation of the spine by tubercles was not at first evident. As tubercles were supposed to exist, the surface was carefully etched with hydrochloric acid and thus the whole pattern was brought out clearly. Numerous individual tubercles were then extracted and examined under the microscope.

The figure of the spine (Pl. 47, Fig. 1) was based on a study of the complete tubercular pattern which was exhibited after the etching had exposed all of the tubercles present. The arrangement and ornamentation of the tubercles are given exactly as they occur on the specimen.

Three transverse fractures of the spine permitted a study of the cross sections and furnished evidence of the character and extent of the medullary cavity (Pl. 47, Figs. 1*a*, 1*b*, 1*c*). The exact character of the deep posterior furrow at the base was brought out clearly by careful removal of the limestone matrix which filled it. (Fig. 1*d*).

DESCRIPTION.

Cosmacanthus elegans n. sp.

PLATE 47.

Type specimen No. M9087 University of California, Palaeontological Museum.

Spine of medium size, 163 mm. long by 23 mm. greatest width, bilaterally symmetrical, tapering, slightly arched, curving backward, cross-section triangular with a sub-acute anterior angle; anterior edge covered above the base by a rounded enamel ridge. The oblique dorsal line separates a smooth base from the ornamented exserted portion and indicates a posterior inclination of about 45°. The lateral faces are slightly rounded. The posterior face is truncated and hollowed below by a deep furrow which is an extension of the medullary cavity. Upper portion of posterior face longitudinally elevated in a low, rounded, median ridge, or keel, between which and the edges of the face are shallow longitudinal furrows. The lateral and posterior faces are covered with small, closely set, and distinctly sculptured tubercles. The sculpturing of the tubercles is in the form of minute oblique lateral ridges which are generally longer on one side of the tubercle, thus making the pattern somewhat asymmetric; the obliquity of the ridges often approximates a spiral type. The sides of the tubercles curve sharply into a

Scan in library
§ QE
1
.C15
3:18

truncated top. On the upper third of the spine, the tubercles are disposed in longitudinal rows parallel with the anterior edge. They increase in number below and dispose themselves in perceptably oblique rows, tending to radiate from the central portion of the posterior edge. The medullary cavity extends for about .85 of the length of the spine and opens in a wide and deep furrow on the lower end of the posterior face. The edges of the lower end of the furrow are sharp and slightly incurved, becoming rounded as they approach each other above to meet near the upper end of the inserted portion.

AFFINITIES.

Isolated dermal spines closely resembling the above in many particulars occur at numerous horizons, being most common on this continent in the Devonian, Sub-Carboniferous, and the Coal Measures. They have been usually grouped under the general term "Ichthyodorulites" and are most frequently referred to the Cestraciontidae.

Among the Ichthyodorulites, a great diversity of form and ornamentation exists, but many spines can be found having some characters in common with the Paris specimen. The smooth base, ornamented faces, and the internal cavity with a low posterior opening, are characters possessed by many genera.

Of the European genera, *Asteracanthus* Agassiz is near this spine in general form and ornamentation, but the similarity breaks down on examination of the individual tubercles and of the posterior surface. One of the conspicuous differences is seen in the entire absence of enlarged tubercles, denticles or teeth on this spine, whereas it possesses a sharply defined enamel keel, which is not present in *Asteracanthus*.

The tendency to arrangement of the tubercles in transverse rows is a character perhaps most marked in *Oracanthus* Agassiz. This genus, however, never shows truncation of the posterior border and the tubercles are also distinctly different from those of the Paris spine.

The general shape of the Paris specimen and its cross-sections, present a strong similarity to the figures of *Nemacanthus monilifer* Agassiz* from the Triassic of England, but the presence of a well marked postero-lateral row of denticles as also the character of the lateral tuberculation in *Nemacanthus* preclude its reference to that genus.

---

*Agassiz L. Recherches sur les Poissons Fossiles. III Atlas 1843. Tab. 7. Figs. 11, 13, 14, 15.

Some similarity also exists between this spine and the fragment from the Sub-Carboniferous which St. John and Worthen* have described as *Glymmatacanthus*, but with such evidence as is at hand one would not be justified in establishing any certain affinities between the two. We know nothing of the character of the posterior face of *Glymmatacanthus*, which, moreover, shows no close agreement in the sculpturing or arrangement of its tubercles and possesses no anterior keel.

The Paris spine can be included in the genus *Cosmacanthus* Agassiz as defined by Woodward.† Its general form, the presence of tuberculation on the lateral faces, and the truncation of the posterior face with low longitudinal keel, are characters which show its relationship to that genus. Of the species which have been included in *Cosmacanthus*, the Paris specimen shows closest affinity with two which St. John and Worthen have described from the Sub-Carboniferous of Illinois and Missouri, and of these, especially with *Cosmacanthus (Geisacanthus) stellatus*. This spine shows clearly the prominent anterior enamel keel, a character which was apparently absent in the type species, *C. malcolmsoni* Agassiz from the old Red Sandstone, as well as in *C. marginalis* Davis and *C. carbonarius* McCoy, from the Irish Carboniferous. It may well be questioned whether this character is not of generic rank and if so the name *Geisacanthus* must be retained for the keeled forms.

The Paris spine is easily separated from the Illinois species by its much greater size, more numerous tubercles and different tubercular pattern, as well as by the difference in the form and sculpturing of the tubercles. For the present we retain it as an Ichthyodorulite, until further information such as its association with teeth, scales, etc. will permit us to identify it with some other form or certainly fix its generic relationship.

At the present time, this is, so far as the author is aware, the only Ichthyodorulite recorded from the American Triassic.

---

*St. John O. and Worthen A. H. Descriptions of Fossil Fishes, Palaeontology of Illinois. Geol. Surv. of Ill. (A. H. Worthen, Director) 1875. Vol. VI, Part II, pp. 446–447; also pp. 440–442.

†Woodward, A. S. Catalogue of the Fossil Fishes in the British Museum. Part II, 1891, p. 111.

It is interesting to note that occurring in the lower Triassic, its affinities are so close with some of the Carboniferous species.

Probably a better knowledge of the ichthyic fauna of our early Triassic will attend a further study of the Idaho beds.

University of California,
May, 1904.

EXPLANATION OF PLATE 47.

Cosmacanthus elegans n. sp.

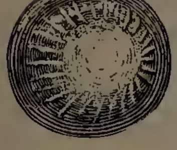
Fig. 1.—Lateral view of spine. (Natural size).

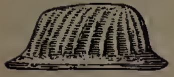
Figs. 1*a*, 1*b*, 1*c*.—Cross sections of spine taken at *a*, *b*, *c*, on figure 1, showing form and extent of the medullary cavity. (Natural size).

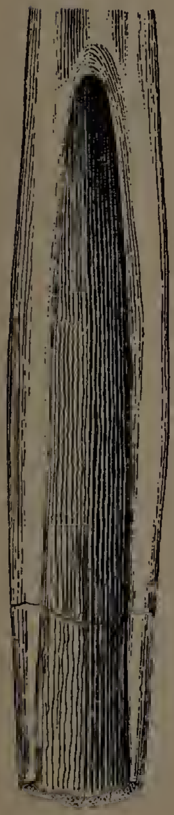
Fig. 1*d*.—Posterior view of base of spine showing character of deep medullary furrow. (Natural size).

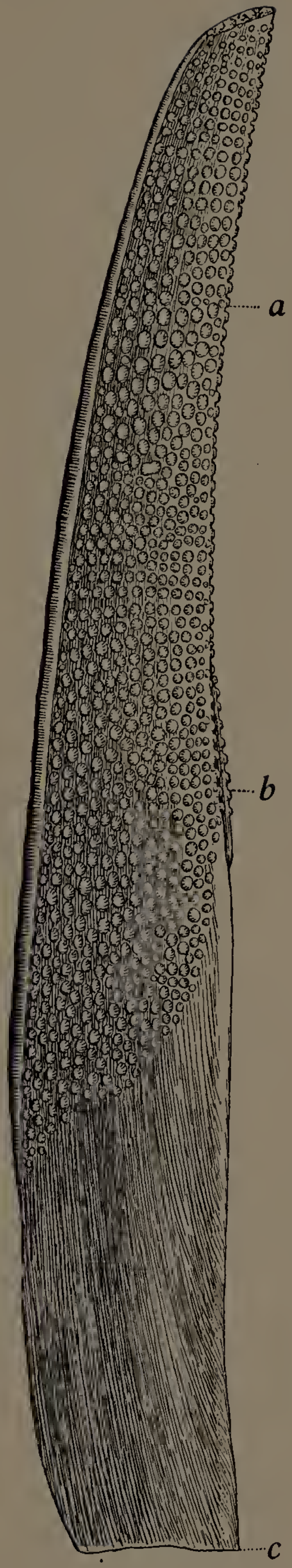
Fig. 2.—Top view of a tubercle showing typical form and sculpturing (× 12.5).

Fig. 2*a*.—Lateral view of the tubercle shown in figure 2. (× 12.5).

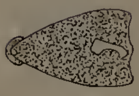

2

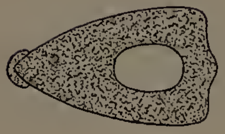

2 a

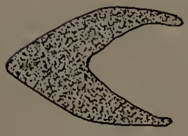

1d



1


1a


1b


1c

WELLESLEY COLLEGE
JUL 9 1942
LIBRARY

VOLUME 3.

No. 1.	The Quaternary of Southern California, by Oscar H. Hershey	Price, 20c
No. 2.	Colemanite from Southern California, by Arthur S. Eakle	Price, 15c
No. 3.	The Eparchæan Interval. A criticism of the use of the term Algonkian, by Andrew C. Lawson	Price, 10c
No. 4.	Triassic Ichthyopterygia from California and Nevada, by John C. Merriam	Price, 50c
No. 5.	A Contribution to the Petrography of the John Day Basin, by Frank C. Calkins	Price, 45c
No. 6.	The Igneous Rocks near Pajaro, by John A. Reid	Price, 15c
No. 7.	Minerals from Leona Heights, Alameda Co., California, by Waldemar T. Schaller	Price, 15c
No. 8.	Plumasite, an Oligoclase-Corundum Rock, near Spanish Peak, California, by Andrew C. Lawson	Price, 10c
No. 9.	Palacheite, by Arthur S. Eakle	Price, 10c
No. 10.	Two New Species of Fossil Turtles from Oregon, by O. P. Hay	In one cover. Price, 10c
No. 11.	A New Tortoise from the Auriferous Gravels of California, by W. J. Sinclair	
No. 12.	New Ichthyosauria from the Upper Triassic of California, by John C. Merriam	Price, 20c
No. 13.	Spodumene from San Diego Co., California, by Waldemar T. Schaller	Price, 10c
No. 14.	The Pliocene and Quaternary Canidae of the Great Valley of California, by John C. Merriam	Price, 15c
No. 15.	The Geomorphogeny of the Upper Kern Basin, by Andrew C. Lawson	Price, 65c
No. 16.	A Note on the Fauna of the Lower Miocene in California, by John C. Merriam	Price, 05c
No. 17.	The Orbicular Gabbro at Dehesa, San Diego Co., California, by Andrew C. Lawson	Price, 10c
No. 18.	A New Cestraciont Spine from the Lower Triassic of Idaho, by Herbert M. Evans	Price, 10c